Vehicle seat, especially for a motor vehicle

Description

The invention relates to a vehicle seat, especially for a motor vehicle, with a seat part made of a hard foam part and a soft foam pad.

Prior art

A vehicle seat according to the generic type is known from patent application DE 198 45 730 A1. The upholstery part is designed as a backrest which has a sandwich construction composed of a shaped foam part of EPP, a soft cushion and a light metal shell mold situated in-between. The shaped foam part is covered on the rear side by a rear wall element.

An upholstery part of this type is suitable, in principle, for reducing the weight of the vehicle in comparison to seats with conventional steel structures. However, the selected construction is suitable only for use in the case of backrests and, in addition, is still relatively heavy because of the metal shell mold used.

Problem

The invention is based on the problem of providing a vehicle seat which is further reduced in weight and is simple to manufacture.

Solution

The problem is solved according to the invention by the upholstery part of the vehicle seat according to the generic type being designed as a seat part and the hard foam part having a surface which, at least in some

regions, is shaped congruently to the vehicle floor and, in the use position of the seat part, can be brought into a positive fit with the vehicle floor, the seat part being releasable from the positive fit and being shiftable into a not-in-use position by means of a hinge mechanism.

This design makes it possible to dispense with a solid hinge mechanism for the seat part that, in particular in the event of a crash, conducts away the weight of the vehicle occupant into the vehicle structure. On the contrary, the forces are transmitted by the positive fit directly from the hard foam part into the vehicle floor, with the result that the hinge mechanism serves only to guide the movement of the seat part. It is therefore possible to secure said seat part directly in the hard foam part, i.e. dispensing with a metallic supporting structure arranged in the seat part.

The hard foam part is preferably composed of expanded polypropylene particle foam (EPP) from which complex, three-dimensional shaped parts of low weight can be produced cost-effectively.

The positive fit can advantageously be produced between a surface of the vehicle floor, which surface extends vertically essentially transversely with respect to the driving direction, and a surface, which runs parallel thereto, of the hard foam part, the surface of the vehicle floor preferably being part of a support-like arching of the vehicle floor, said arching running horizontally and transversely with respect to the direction of travel (Y direction), and the surface of the hard foam part being part of a first recess, which runs in the same direction, in the hard foam part.

According to a particular design of the invention, the hinge mechanism comprises a hinge arm which is

connected at one end in an articulated manner to the vehicle floor and is connected at its other end in an articulated manner to the hard foam part in such a manner that the seat part can be brought out of its use position into a not-in-use position shifted parallel thereto. The seat part is therefore not folded from its use position into the not-in-use position but rather the same surface side always faces the vehicle floor. In this case, both hinges preferably have axes of rotation extending in the Y direction, with the hinge assigned to the hard foam part, in the use position of the seat part, being offset rearward counter to the direction of travel (X direction) in relation to the hinge assigned to the vehicle floor.

In order to simplify the initial installation, but also a fixing of the seat part after it has been temporarily removed, it can be provided that the hinge assigned to the hard foam part can be latched therein during installation of the seat part.

In order also to secure the position of the seat part in the not-in-use position, in the not-in-use position, the seat part can preferably be brought into a positive fit with the arching of the vehicle floor by means of a second recess in the hard foam part. In this case, the first and second recesses may naturally have contours which largely correspond and are offset parallel to one another.

In order, in the event of a crash, to prevent the vehicle occupant from slipping through under the lap belt, the upper side of the hard foam part is preferably designed such that it drops rearward in the form of a ramp. In this case, a virtual straight line running between the surface of the first recess and the ischial tuberosity of the seat occupant is advantageously inclined by an angle of 25° to 35°,

preferably approximately 30°, with respect to the horizontal in order to conduct away the forces of inertia, which are caused by the weight of the seat occupant in the event of a crash, optimally into the structure of the vehicle floor.

In order to design the conversion of a vehicle seat, which is preferably designed as described previously, such that it is particularly convenient, it can be provided that the seat part is operatively connected to a pivotably mounted backrest of the vehicle seat in such manner that, when the backrest is folded forward from the upright use position into a not-in-use position, the seat part, for its part, is shifted from the use position into the not-in-use position.

This is preferably brought about by the backrest being connected rotatably to a transmission linkage which is arranged offset with respect to the pivot axis of said backrest. In this case, the transmission linkage can be equipped at its end assigned to the hinge arm with a rack-like toothing which is suitable, in conjunction with a circular mating toothing formed on the hinge arm, for producing a torque about one of its hinges. For space reasons, the mating toothing is advantageously formed in the region of that hinge of the hinge arm which is assigned to the vehicle floor.

Figures

The figures illustrate an embodiment of the invention by way of example and diagrammatically.

In the figures:

fig. 1 shows a vehicle seat designed according to the invention in the use position,

fig. 1a shows a less detailed illustration of the seat part according to fig. 1,

figs. 2 and 3 show the vehicle seat according to fig. 1 in intermediate positions, and

fig. 4 shows the same vehicle seat in its not-in-use position.

The vehicle seat illustrated in fig. 1 comprises a seat part 1 and a backrest 2 which is provided with a head restraint 3. The seat part 1 is composed of a hard foam part 4 made of EPP which drops on the upper side in the form of a ramp and which, on its side facing the seat occupant, is provided with a soft foam pad 5 made of polyurethane foam. The latter is covered at the end with a textile or leather cover (not illustrated).

As is apparent from fig. 1a, the lower side of the hard foam part 4, which side rests on the vehicle floor 6, is provided with recesses 7, 8 which are at a distance from each other in the direction of travel, are essentially identical in contour and of which the front recess 7 engages with a positive fit around a support-like forward arching 9 in the vehicle floor 6. In this case, at least one surface 10 of the recess 7, which surface is defined by an approximately vertical axis and an axis running transversely with respect to the direction of travel, bears against a surface 11, which runs parallel, of the vehicle floor 6 in such a manner that shearing forces acting on the seat part 1 in the direction of travel X are conducted away into the vehicle floor. Of course, the transmission, by means of a positive fit, of centrifugal forces may additionally also be provided by the formation of further, correspondingly turned surfaces. It is likewise conceivable to place the seat part onto pins protruding from the vehicle floor. The essential feature for the

implementation of the invention is the presence of surface structures on the vehicle floor 6 and seat part 1 that are suitable, by means of surface contact, for the transmission of corresponding shearing forces.

In order to avoid a tilting of the seat part 1 in the event of a crash, the imaginary straight line G runs between the center of the contact region of the surface 10 and the ischial tuberosity 12, which is sunk into the soft foam pad 5, at an angle α of approximately 30° with respect to the horizontal. The surface 10 is oriented orthogonally to the straight line G, is therefore inclined by 60° with respect to the horizontal and therefore runs essentially vertically.

To intercept a torque nevertheless occurring about the contact region of the surfaces 10, 11, the rear region of the seat part 1 is pushed under the backrest 2 and is pulled out of this means of securing during the transfer into the not-in-use position (see fig. 1). The hinge mechanism 13 used for this comprises a hinge arm 14 which is oriented horizontally in the use position of the seat part and is connected rotatably via a first hinge 15 to the vehicle floor 6 and via a second hinge 16 to the hard foam part 4 of the seat part 1. For the insertion of the seat part, with the hinge arm 14 fitted on the vehicle floor 6, the hinge 16 can be latched into a clip connection 17 of the hard foam part 4. The clip connection 17 is screwed down directly in the hard foam part 4. Since the hinge mechanism 13 only has to absorb the low dead weight of the seat part 1 as it shifts into the not-in-use position, high-strength inserts in the seat part 1 can be dispensed with.

A coupling of the movement of backrest 2 and seat part 1 is brought about by a transmission linkage 18 which is shaped in the manner of a J and is mounted rotatably on the backrest 2 in a hinge 19 in a manner such that

it is offset downward in relation to the pivot axis 20. When the backrest 2 is folded forward (figures 2 to 4), the transmission linkage 18 is displaced rearward counter to the direction of travel. The front end of the transmission linkage 18 is with a rack-like toothing 21 which is in engagement with a circularly designed mating toothing 22 of the hinge arm 14 and pivots the latter forward about the hinge 15 in the space above the vehicle floor 6. In the process, the seat part 1 is raised in the front region by the hinge arm 14, with the front recess 7 first of all being moved essentially upward in relation to the forward arching 9 and its rear end, which is mounted displaceably in a rail guide (not illustrated), being pulled forward under the backrest 2.

When the not-in-use position is reached (fig. 4), the seat part 1 is again in a horizontal position, i.e. has been shifted parallel in relation to the use position according to fig. 1. In this case, the rear recess 8 is placed onto the support-like forward arching 9 of the vehicle floor 6 with a positive fit by an essentially downwardly directed relative movement during the last stage of the movement sequence, with the hinge arm 14 again taking up a horizontal position but in which it is rotated through 180° in relation to the initial position.

Designations

1	Seat part
2	Backrest
3	Head restraint
4	Hard foam part
5	Soft foam pad
6	Vehicle floor
7, 8	Recess
9	Forward arching
10, 11	Surface
12	Ischial tuberosity
13	Hinge mechanism
14	Hinge arm
15, 16	Hinge
17	Clip connection
18	Transmission linkage
19	Hinge
20	Pivot axis
21	Toothing
22	Mating toothing
G	Straight line